East Anglia ONE

Offshore Windfarm

Non Technical Summary

Document Reference –

7.1 Non Technical Summary

APFP Regulation – 5 (2) (a)
Author – East Anglia Offshore Windfarm Limited
Date – Nov 2012
Revision History - Revision A

www.eastangliawind.com
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1 Introduction

1.1 About this Document

This document is the Non –Technical Summary (NTS) of the Environmental Statement (ES) for the East Anglia ONE Offshore Windfarm (also known as the East Anglia ONE project). It provides a summary of the project, the site selection process and the key findings of the Environmental Impact Assessment (EIA).

2 The East Anglia ONE Offshore Windfarm is a Nationally Significant Infrastructure Project (NSIP). Consent to construct, operate and decommission the East Anglia ONE project is therefore being requested from the National Infrastructure Directorate, which is part of The Planning Inspectorate, under The Planning Act 2008.

3 The purpose of the EIA is to assess and examine the potential impacts of the project on the environment, from construction through to decommissioning. In accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009, the findings of the EIA process have been presented in an Environmental Statement and submitted as part of the consent application for the East Anglia ONE project.

4 The East Anglia ONE project would comprise offshore wind turbines and offshore and onshore export cables taking power to a converter station adjacent to the existing substation at Bramford, Suffolk. The East Anglia ONE site is approximately 43km from the Suffolk coast at its closest point to land. The East Anglia ONE Development Area is shown in Figure 1.

1.2 Who is Developing the Project

5 East Anglia Offshore Wind Limited (EAOW) is a joint venture owned 50:50 by ScottishPower Renewables (UK) Limited (SPR) and Vattenfall Wind Power Ltd (VWPL). SPR is part of Iberdrola, a world leader in wind power. The Iberdrola Group’s Offshore Wind Business is managed through ScottishPower Renewables. SPR is responsible for progressing Iberdrola’s onshore wind and marine energy projects in the UK and Ireland, and offshore windfarms throughout the world. VWPL’s ultimate holding company is a state owned Swedish energy utility. Vattenfall currently owns and operates a number of offshore windfarms around Europe. In the UK, Vattenfall owns and operates Kentish Flats, Ormonde and Thanet Offshore Windfarms.

6 In December 2009, The Crown Estate Commissioners awarded EAOW exclusive rights to develop approximately 7,200MW of wind capacity within an area of sea off
the coast of East Anglia known as zone 5. This award was given to EAOW as part of The Crown Estate’s UK Round 3 Offshore Wind Licensing process. The first project to be developed within this zone is the East Anglia ONE project.

1.3 **Role of National Policy Statements in the Decision Making Process**

Three National Policy Statements (NPS) are of relevance to the East Anglia ONE project.

- **NPS Overarching Energy (EN-1):** contains a statement that there should be a presumption in favour of granting consent for projects that are in accordance with the relevant NPSs. It specifically recognises that offshore wind is key to meeting UK policy objectives, and provides advice on the assessment of environmental impacts of projects.

- **NPS Renewable Energy Infrastructure (EN-3):** defines offshore wind projects of more than 100MW as being Nationally Significant Infrastructure Projects (NSIP), and therefore covered by the remit of the Planning Act 2008. The NPS provides advice on the assessment of environmental impacts from offshore wind, and stresses the importance of careful consideration of issues relating to navigation and marine safety.

- **NPS Electricity Networks (EN-5):** covers the long distance electricity transmission systems and distribution systems, as well as infrastructure such as substations and converter stations.

The ES outlines how the East Anglia ONE project complies with these NPSs to enable the Planning Inspectorate to make a planning recommendation to the Secretary of State for Energy and Climate Change, the ultimate decision maker.

1.4 **Need for the Project**

Under the Climate Change Act 2008, the UK Government has set the world’s first legally binding target to reduce greenhouse gas emissions in order to facilitate a transition to low carbon energy. A set of ‘carbon budgets’ each covering a five-year period has been established with the aim of cutting UK emissions by at least 34% by 2020 and at least 80% by 2050.

With the potential for over 30% of UK electricity to be generated from renewable sources, much of which would need to come from offshore wind (The UK Renewable Energy Strategy, DECC 2009) the East Anglia ONE project would make a significant contribution to the emissions target and to meeting the UK’s 2020
renewable energy generation targets, thereby contributing to the global initiative to tackle climate change.

11 As set out in National Policy Statement EN-1, it is important to ensure that the UK has secure and reliable supplies of electricity as we make the transition to a low carbon economy. Offshore wind energy will contribute to this objective.

1.5 Site Selection and Consideration of Alternatives

12 In response to the UK’s energy needs, the Government embarked on a plan to identify areas of sea off the coasts of England and Wales suitable for the development of large scale offshore windfarms, known as the Round 3 Offshore Wind Plan.

13 As a consequence of this, the East Anglia zone was identified by the Government and The Crown Estate following a Strategic Environmental Assessment. In 2009, EAOW was awarded the rights to develop this zone.

14 Within the zone, the location of the East Anglia ONE site was identified following a review of available environmental and technical information. Important environmental considerations included:

- the presence of an internationally protected nature conservation site for birds in the west of the zone;

- shipping and navigation, including designated and heavily used routes, throughout the zone;

- the presence of oil and gas infrastructure, particularly in the north of the zone, and aggregate dredging areas; and

- the potential for civil and military radar interference.

15 Technical considerations included likely wind resource, the suitability of seabed conditions and the distance from the nearest port.

16 EAOW also undertook assessments and consultation to identify the optimum export cable route, in terms of minimising environmental impacts and disruption. An Offshore Cable Corridor and Onshore Cable Route were developed following agreement with National Grid of a connection point to the electricity network at Bramford, Suffolk.
When defining the Offshore Cable Corridor, a number of features were mapped and avoided. These included a subsea explosives dumping ground, licensed dredging areas, a proposed Marine Conservation Zone (MCZ), shipping lanes and designated anchoring areas associated with port activity at Harwich and Felixstowe Ports. The Offshore Cable Corridor is shown in Figure 2.

When defining the Onshore Cable Route, built up areas and designated sites were avoided, where possible. Landscape impacts were minimised by avoiding large areas of woodland and reducing the need to create gaps in hedgerows. The Onshore Cable is shown in Figure 3 and Figure 4.

The location of the Converter Station Compound for the East Anglia ONE project, shown in Figure 5, was chosen to be as near to the existing Bramford electricity substation as possible, following advice from the local authorities and consideration of a number of potential locations. High resolution photomontages were created to assess landscape impacts. An illustrative photomontage is presented in Figure 6.
2 Description of the East Anglia ONE Project

2.1 Introduction to the Project

1 The East Anglia ONE project would comprise:

- offshore wind turbines and foundations (up to 325 wind turbines to provide an installed capacity of up to 1,200MW);

- scour protection around the foundations and on inter-array and export cables, if required, to limit erosion of seabed material caused by water movements near structures;

- One meteorological mast within the East Anglia ONE site;

- offshore collector stations to collect the electricity from the wind turbines;

- offshore converter stations to transfer the electricity from high voltage alternating current (HVAC) to high voltage direct current (HVDC) for export to shore;

- offshore undersea inter-array cables between the wind turbines and offshore collector station and converter station platforms;

- offshore undersea export cables to transmit electricity from the windfarm to the shore;

- a landfall site with onshore jointing bays to connect the offshore and onshore cables;

- onshore underground export cables to transmit electricity to a new onshore converter station; and

- an onshore converter station adjacent to an existing substation at Bramford, Suffolk, to convert the electricity from DC to AC before transmission to the National Grid electricity network via an underground connection.

2 Diagram 2-1 presents a high level schematic of the East Anglia ONE project to the point where it links to the existing Bramford substation.
2.2 Offshore Project Characteristics

The offshore project would comprise offshore wind turbines, collector and converter stations and inter-array cables within the site boundary, and offshore export cables to take the power generated by the turbines to shore. Key offshore project characteristics are provided below.
## Offshore Project Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum windfarm capacity</td>
<td>1200 Mega Watts (MW)</td>
</tr>
<tr>
<td>Maximum number of offshore wind turbines</td>
<td>325</td>
</tr>
<tr>
<td>Wind turbine size</td>
<td>Up to three different sizes installed, ranging from 3MW to 8MW</td>
</tr>
<tr>
<td>Minimum wind turbine spacing</td>
<td>675m in rows; 900m between rows</td>
</tr>
<tr>
<td>Maximum wind turbine rotor diameter</td>
<td>170m</td>
</tr>
<tr>
<td>Maximum wind turbine hub height (above LAT*)</td>
<td>120m</td>
</tr>
<tr>
<td>Maximum wind turbine blade tip height (above LAT*)</td>
<td>200m</td>
</tr>
<tr>
<td>Minimum wind turbine blade clearance above sea surface (above MHWS**)</td>
<td>22m</td>
</tr>
<tr>
<td>Wind turbine, converter and collector station</td>
<td>Jacket structure, gravity base, suction caisson</td>
</tr>
<tr>
<td>Foundation options</td>
<td></td>
</tr>
<tr>
<td>Number of proposed operational meteorological masts</td>
<td>One</td>
</tr>
<tr>
<td>Maximum number of gravity base or suction caisson foundations</td>
<td>240</td>
</tr>
<tr>
<td>Maximum number of offshore collector stations</td>
<td>Three</td>
</tr>
<tr>
<td>Maximum number of offshore converter stations</td>
<td>Two</td>
</tr>
<tr>
<td>Maximum water depth</td>
<td>Approximately 53m</td>
</tr>
<tr>
<td>Nearest distance of windfarm site to shore</td>
<td>Approximately 43km</td>
</tr>
<tr>
<td>Maximum length of inter-array cables</td>
<td>Approximately 550km</td>
</tr>
<tr>
<td>Maximum number of export cables from</td>
<td>Four</td>
</tr>
</tbody>
</table>
Offshore Project Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum windfarm capacity</td>
<td>1200 Mega Watts (MW)</td>
</tr>
<tr>
<td>East Anglia ONE</td>
<td></td>
</tr>
<tr>
<td>Length of Offshore Cable Corridor</td>
<td>Approximately 73km</td>
</tr>
<tr>
<td>Landfall location</td>
<td>Bawdsey</td>
</tr>
</tbody>
</table>

Table 2-1 Offshore Project Characteristics

*Lowest Astronomical Tide  **Mean High Water Springs

The foundation types under consideration for East Anglia ONE wind turbines, collector and converter stations are steel jacket foundations, gravity bases and suction caissons. Indicative diagrams of each of these foundations are included as Diagram 2-2, Diagram 2-3, and Diagram 2-4 below. Plate 2-1 shows a construction vessel adjacent to a completed wind turbine and foundation. The foundation options for the meteorological mast include a steel jacket, suction caisson or monopile foundation.

Diagram 2-2 Indicative Steel Jacket Foundations (Source: Garrad Hassan, with annotations by EAOW)
Diagram 2-3 Indicative Gravity Base Foundations (Source: Garrad Hassan, with annotations by EAOW)

Diagram 2-4 Indicative Suction Cassion Foundations (Source: Garrad Hassan, with annotations by EAOW)
The offshore construction works for the East Anglia ONE project are anticipated to take up to two and a half years to complete and would be undertaken 24 hours a day, seven days a week where necessary.

Plate 2-1 Wind turbine tower and blade transported on a jack-up vessel adjacent to an installed REpower 5M wind turbine (tip height of 153m) on steel jacket foundation. Source: Vattenfall Wind Power Ltd

Maintenance and servicing of the wind turbines, and offshore collector and converter stations would take place on a regular basis. Each wind turbine would be controlled by an on-board computer system, which would automatically monitor a number of parameters to maximise energy generation, increase safety and enable remote shutdown, if required.

2.3 Onshore Project Characteristics

The onshore components of the project would comprise onshore underground export cables which could be laid in ducts and a converter station at Bramford to enable power from the windfarm to be transmitted to the National Grid electricity network.

As well as the four cables from the East Anglia ONE project, the Onshore Cable Route is wide enough to give the option of installing ducting for up to eight cables to allow the connection of two future projects from within the East Anglia zone to
Bramford. Installing these cable ducts at the same time as installing the cables for East Anglia ONE would reduce the overall disruption of the onshore works.

9 All onshore export cables and ducts would be buried within a typical working width of 55m. This working width would also include a temporary haul road and temporary areas for the storage of spoil (Diagram 2-5 below).
Diagram 2-5 Schematic Showing Activities within the Onshore Cable Route Working Width
Where the cables cross roads, railways, rivers and environmentally sensitive areas, the technique of horizontal directional drill (HDD), whereby a hole is drilled under the feature and the cable or duct is pulled through, would be used to avoid damage to surface features. HDD would be used at the landfall at Bawdsey and at the locations identified below:

- River Deben (major water course, designated SPA and SSSI site);
- Kirton Creek (significant water course);
- Martlesham Creek (major water course);
- Railway crossing at Kingston (East Suffolk Railway);
- A12 crossing north of Martlesham (major road crossing);
- Little Bealings (crossing of Lodge Road and woodland);
- A14 crossing at Little Blakenham (major road crossing);
- River Gipping, Bramford Road and Great Eastern Railway crossing east of Little Blakenham (water course, road and railway); and
- Millers Wood (designated as ancient woodland and County Wildlife Site).

At the HDD locations, the working width would be widened to 160m. Each HDD would also require a temporary compound of 2,500m$^2$ at the entrance and exit points. At the landfall at Bawdsey the cables would emerge at transition pits located at a sufficient distance back from the cliff edge to ensure they would not be affected by coastal erosion.

Approximately every 1km along the export cable route, underground jointing bays would be required to join lengths of cable together. Following construction, inspection pit covers, and a small marker post and kiosk, would be visible.

Seven areas adjacent to the cable route, known as Construction Consolidation Compounds (CCSs), have been defined (Figure 4). The CCSs would be used during construction to provide access to the cable route haul road, store material and equipment and house site administration and welfare facilities.
14 Vehicles required during the construction of the project would access the works area via the routes shown on Figure 4. Temporary works on existing roads, including road widening, corner re-alignment and the creation of new passing places, would also be required, all within the highway boundary.

15 In order to connect the windfarm to the national transmission network at Bramford, a new onshore converter station is required. The onshore converter station would be located within a single compound and screened with earth mounds and planting. The final design of the converter station would be subject to local authority approval in accordance with pre-agreed design principles. Photomontages have been prepared and assessed within the full Environmental Statement, an example has been recreated within this NTS as Figure 6. Figure 7 presents illustrative elevations and floor plans for the Onshore Converter Station.

16 Prior to construction, EAOW would produce a number of documents, in consultation with the local authority, to ensure appropriate onshore construction management. These would include:

- a Code of Construction Practice - outlines how construction would be managed in accordance with legislation and following best practice containing:
  - an Air Quality Management Plan – outlines dust control and traffic management measures; and
  - a Traffic Management Plan – outlines how construction traffic to the site would be managed so as to reduce impacts;

- an Ecological Management Plan – outlines the ecological mitigation measures required;

- a Written Scheme of Investigation – outlines how archaeological finds would be monitored and recorded;

- an Access Management Plan – outlines how any highway works required to access the project would be developed and constructed; and

- a Travel Plan – outlines how personnel associated with the construction of the project would travel to and from the site.
Key onshore project characteristics are provided below.

<table>
<thead>
<tr>
<th>Onshore Project Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of jointing pits at landfall</td>
<td>Up to 12 (5m x 10m x 5m depth)</td>
</tr>
<tr>
<td>Maximum number of export cables for East Anglia ONE</td>
<td>Four</td>
</tr>
<tr>
<td>Length of Onshore Cable Route</td>
<td>37km</td>
</tr>
<tr>
<td>Maximum number of ducts which could be installed for future project export cables</td>
<td>Eight</td>
</tr>
<tr>
<td>Maximum cable route working width</td>
<td>55m (160m at HDD locations)</td>
</tr>
<tr>
<td>Size of HDD Construction Compounds at entrance and exit points</td>
<td>2500m² and 750m² respectively</td>
</tr>
<tr>
<td>Number of jointing pits along onshore cable route</td>
<td>One per 1km (5m x 10m x 5m depth)</td>
</tr>
<tr>
<td>Number of Construction Consolidation Sites (CCSs)</td>
<td>Seven in total: two primary sites (15,000m²) five secondary sites (10,000m²)</td>
</tr>
<tr>
<td>Location of Converter Station Compound and associated Temporary Works Area</td>
<td>Bramford, Suffolk</td>
</tr>
<tr>
<td>Size of Converter Station Compound</td>
<td>150m x 190m within which a number of buildings could be located up to 25m in height (as shown in Figure 6)</td>
</tr>
</tbody>
</table>

Table 2-2 Onshore Project Characteristics

The onshore construction works are anticipated to take around one year to complete. However the work could be staged and as such take place over a period of two years. Works at HDD sites could be undertaken during the day and night. CCSs would be manned 24hrs a day. All other works would occur between 0700 hours and 1900 hours Monday to Saturday, with no activity on Sundays or bank holidays unless agreed in advance with the local authority.
2.4 Regulatory Consents

19 The Planning Act 2008 introduced a new planning system in England and Wales for Nationally Significant Infrastructure Projects. This includes a new consenting regime for major infrastructure projects under which a Development Consent Order (DCO) may be granted. The DCO incorporates a number of other consents from different consenting regimes including:

- planning permission, normally granted under the Town and Country Planning Act 1990;

- consent to construct and operate a generating station, normally consented under section 36 of the Electricity Act 1989; and

- a marine licence allowing articles to be deposited at sea, normally granted under the Marine and Coastal Access Act 2009.

20 As part of its application for a DCO, EAOW is seeking these permissions, consents and licences. Powers to compulsorily acquire land or rights, either permanently or temporarily are also being sought within the DCO.

21 Safety zones during construction and operation will be requested following granting of a DCO to ensure the safety of individuals and vessels during construction, and operation and maintenance as per the Energy Act 2004.

22 The EIA process is governed by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations). The EIA Regulations prohibit a DCO to be granted unless the decision making body has first taken account of the environmental information compiled through the EIA process.
3 The Environmental Impact Assessment Process

3.1 Introduction

1 The purpose of EIA is to provide adequate information to decision makers on the potential environmental effects of a project. EIA requires an understanding of the baseline environment, using existing information and site specific survey data. The potential impacts of a project, both positive and negative, are then assessed, taking into account the importance of the ‘receptor’ affected and the magnitude of the effect. Significant impacts are identified and measures to avoid or reduce these impacts (known as mitigation measures) are considered. Significant impacts that remain after mitigation are reported as ‘residual impacts’.

2 For each part of the project design (e.g., foundations or wind turbines), the option that could result in the greatest environmental impact has been assessed; this is known as the ‘worst case’ option. This approach ensures that the full range of development possibilities, and their likely environmental impacts, is accounted for within the EIA.

3 A Cumulative Impact Assessment has been undertaken for each topic considered. This identifies potential impacts from the East Anglia ONE project which could interact with impacts from other projects within the same region.

4 The EIA for the offshore aspects of the East Anglia ONE project has been undertaken by Environmental Resources Management Ltd (ERM); RSK Environment Limited (RSK) has carried out the EIA for the onshore aspects of the project. Both offshore and onshore EIAs incorporate input from specialists, including ecologists, oceanographers, archaeologists and landscape architects. The product of the EIA is the Environmental Statement which presents the results of the onshore and offshore EIA for the East Anglia ONE project.

5 The EIA has been shaped by consultation with both statutory consultees and stakeholders, and informed by the production of four key documents: the East Anglia ONE Offshore Windfarm EIA Scoping Report (July, 2010), the East Anglia ONE Offshore Windfarm EIA Scoping Report: Supplementary Information on Connection to the Onshore Electricity Transmission Works (October 2010), the Preliminary Environmental Information Report (PEIR) (February 2012) and the East Anglia ONE Part 2 Consultation Document: Project Description of Onshore Works (June 2012).
3.2 Data Collection and Surveys

To fully understand the nature and characteristics of the existing environment a number of surveys has been undertaken, covering the East Anglia ONE windfarm site, the Offshore Cable Corridor, and the Onshore Cable Route, including the Converter Station Compound and Temporary Works Area. These include:

7 Offshore:

- geophysical surveys to understand the surface and subsurface features of the seabed (including marine archaeological features);
- benthic and epibenthic survey to characterise the flora and fauna that live on or in the seabed;
- geotechnical survey to provide information on seabed composition;
- metocean surveys to understand the physical environment offshore, including waves, currents and tides;
- commercial fishing activity and natural fish resource surveys;
- twenty four months of aerial surveys and 12 months of boat based surveys to identify and estimate populations of marine mammals and birds in the area; and
- shipping activity surveys in the vicinity of the windfarm site.

8 Onshore:

- aerial photography survey along the onshore cable corridor to support site selection and EIA;
- wintering and breeding birds surveys at certain locations;
- surveys to identify the presence of protected species, including reptiles, badgers, water voles and bats;
- ecological habitat surveys; and
- archaeological walkover survey.

3.3 Consultation

Regular consultation has been held with statutory organisations, including relevant local authorities, nature conservation bodies, shipping advisers and those with an
interest in the land that may be affected. Other interested stakeholders, such as the RSPB, the Chamber of Shipping and Suffolk Wildlife Trust, and fishermen, have also been consulted. Statutory and other stakeholders have been provided with Scoping Reports, the Preliminary Environmental Information Report and the Part 2 Consultation Document on onshore works, to supply consultees with technical information enabling meaningful and directed consultation on the key issues.

10 The Planning Act 2008 emphasises the need for consultation with local communities before the DCO application is submitted. The aim of this ‘pre-application consultation’ is to help local communities understand what the project is likely to mean to them and enable them to provide feedback. EAOW divided its pre-application consultation into a number of phases, with Public Information Days held to support each phase:

- **Phase 1 (Parts 1 and 2):** 20 July to 31 October 2011 – consultation on the electrical transmission works to feed into the routeing of onshore and offshore cables and the converter station location;

- **Phase 2, Part 1:** 10 February to 30 March 2012 – consultation on the details of the offshore windfarm and the associated onshore and offshore electrical works and cables; and

- **Phase 2, Part 2:** 6 July to 3 September 2012 – additional consultation on the proposed onshore works.

11 Early consultation has been particularly valuable during the process of cable route selection.

12 The full extent of the consultation undertaken in relation to the East Anglia ONE project is described in the Consultation Report, which was submitted with the DCO application.
4 Offshore Environmental Impacts

4.1 Introduction

1 The EIA has identified the impacts on and in the marine environment that are likely to arise as a result of the project. These include impacts on the physical, biological and human environment.

4.2 Marine Geology, Oceanography and Physical Processes

2 Water and sediment movement within the East Anglia ONE site was modelled using historical data and information collected during site-specific seabed and metocean surveys. Changes in suspended sediments, seabed levels and sediment type arising from the installation of foundations and cables were modelled and the results considered in relation to key receptors: specifically the East Anglian coastline, coastal and offshore designated sites and offshore sandbanks.

3 The assessment found that impacts on all receptors would not be significant.

4.3 Marine Water Quality

4 Potential impacts on marine water quality were assessed. These included increases in levels of suspended sediments, disturbance of sediment contaminants and release of chemicals during the construction and decommissioning phases. Impacts from scour and accidental spillage of materials during operation and maintenance work were also considered.

5 Numerical modelling indicated that any changes to suspended sediment levels would be within the range of natural variability. Sediment contamination is understood to be low within the project area and so impacts from sediment disturbance are not anticipated. In order to reduce the level of suspended sediments during construction, gravity bases would not be placed in areas with very large sandwaves. Construction best practice would minimise risks from spillages. Impacts on water quality would not be significant.

4.4 Benthic and Epibenthic Environment (including Shellfish)

6 The benthic (organisms living on and above the seabed) and epibenthic (organisms living within the seabed) environment within the East Anglia ONE site is dominated by sandy sediments with worms and shellfish.
A species of worm, known as the Ross Worm, was found within the site. This worm builds tubes that can form small reef-like structures which are protected and are important as protected at a European level. A potential reef structure was identified at a single location along the Offshore Cable Corridor and at three locations within the East Anglia ONE site.

Plate 4-1 Illustrations of the seabed within the East Anglia ONE site. Source: EAOW (MESL benthic and epibenthic survey photographs)

The introduction of foundation structures, scour and cable crossing protection material would result in a small reduction in the sandy habitat available. However, these structures are expected to be colonised rapidly, creating a more varied environment and increasing biodiversity.

Careful site selection has ensured that all sites designated for seabed habitats have been avoided. The positioning of foundations and micro-routeing of the cables would ensure that areas of potential reef would be unaffected.

Impacts on benthic and epibenthic organisms are not significant.

4.5 Underwater Noise and Vibration and Electromagnetic Fields

Underwater noise that would be generated during construction of the windfarm, particularly during piling of jacket foundations, has the potential to result in impacts on marine mammals and fish. The potential noise generated during construction of
the windfarm has been modelled and the results used to inform the fish and marine mammal impact assessments.

12 The transportation of electricity within cables results in the generation of electric and magnetic fields (EMF). A relatively large number of organisms in the marine environment are sensitive to EMFs.

13 Potential EMFs from the type of offshore cables likely to be used for the East Anglia ONE project have been predicted and an assessment has been undertaken to determine the effects of these fields on invertebrates, marine mammals and fish.

14 Assuming cable burial, no effects are expected on invertebrates or marine mammals. Some fish species (sharks, skates and rays) could be affected; however any impacts would be of minor significance and would only occur very close to the cables.

4.6 Fish Ecology

15 Fish within the East Anglia ONE site were sampled using a combination of otter trawls and beam trawls. Whiting, plaice, sand goby, sandeel and pogge were among the most common fish species recorded. Commercial landings records were reviewed from the area of the Offshore Cable Corridor; the principal fish species landed is plaice, along with sprat, sole, cod, horse mackerel and a range of sharks and rays.

16 The installation of foundations and cabling would result in short-term increases in both suspended sediments and noise in the area during construction, which could affect fish and their eggs and larvae.

17 Pile driving would only be required for pin piles associated with jacket foundations, if this option was taken forward. Where pin pile driving is required, a soft start method would be used whereby the pile hammer pressure, and therefore sound levels, is increased slowly allowing fish to move away from the area. Cables would also be buried, where practicable, to reduce any effects from EMFs.

18 With mitigation in place, the impacts to fish would not be significant.

4.7 Marine Mammals

19 Surveys undertaken within the East Anglia ONE site identified a number of species of marine mammals; harbour porpoise was the most commonly recorded.
During construction, the potential for injury and disturbance of harbour porpoise due to noise from foundation installation activities has been assessed. The implementation of a Marine Mammal Mitigation Protocol and the use of soft start procedures would ensure that marine mammals would move away from the area prior to each piling operation.

During operation, the potential for impacts from vessel movements and EMFs were considered.

With mitigation in place, it was concluded that impacts to marine mammals would not be significant.

4.8 Ornithology (Marine and Coastal)

Potential ornithological impacts relate to disturbance, displacement, collision risk and the barrier effect. In addition secondary potential impacts can occur as a result of interruptions and disturbance to bird species food supply.

An assessment of these impacts has been made for key species identified during surveys during the construction, operation and decommissioning. The impacts are based on the site-specific sensitivity levels assigned to the species, the predicted magnitude of effect of them and the inclusion of relevant mitigation measures.

From the surveys and subsequent impact assessment it is evident that in the majority of instances the effects predicted from the operational windfarm and offshore cable corridor are negligible in the main, minor in some instances and minor to moderate in even fewer instances (before mitigation). Significant residual impacts are those associated with red-throated diver (minor to moderate (but tolerable)) from disturbance and displacement during the operation period. Although a reduction in the likely impact on red-throated diver is not possible through mitigation it is yet to be proven that the levels of displacement are in fact as severe as predicted within this environmental impact assessment. New, currently unpublished, research is in the process of assessing the levels of disturbance and displacement on divers from offshore windfarms.

Another key species assessed is the lesser black-backed gulls. These gulls may be associated with the Alde-Ore SPA population that has suffered serious decline in the last decade, an assessment of impacts particularly around collisions risk has shown that the proposed construction of East Anglia ONE, has a negligible effect on the number of lesser black-backed gulls expected to be present at the Alde-Ore SPA.
On this basis it is considered that there would not be an adverse effect on breeding lesser black-backed gulls or the integrity of the Alde-Ore SPA due to collision mortality arising from the operation of East Anglia ONE.

Plate 4-2 Herring Gull in-flight at 3cm resolution taken during the East Anglia ONE site aerial survey

A cumulative impact assessment has also been undertaken which shows that when considering other projects within the southern North Sea there would be no significant changes to the predicted level of effects on any species due to possible cumulative additional effects.

In summary, when embedded and additional mitigation measures are accounted for, there is a minimal risk of potential significant effects on species’ populations within and surrounding the East Anglia ONE site on a regional, national and international level as a direct result of activities and operations associated with the East Anglia ONE project.

Plate 4-3 Red Throated Diver (Gavia stellata) in Winter Cover. Source: Shutterstock.com (Copyright Menno Schaefer)
4.9 Commercial Fisheries

30 The area of sea in which the East Anglia ONE project would be located is recognised as an important area for commercial fishermen, based in the UK and The Netherlands, Belgium and France. Impacts of construction, operation and decommissioning activities on all commercial fisheries were assessed within the EIA.

Plate 4-4 Typical Larger Category of Dutch Beam Trawler. Source: J van Dam

31 The safety of fishing vessels and crew during all phases of the project is of particular importance. The potential risk from collisions of fishing boats with other vessels or with wind turbines and other structures was assessed, and it was concluded that risks would be within acceptable limits.

32 A key concern for fishermen is the potential loss of fishing area due to the construction, operation and decommissioning of the East Anglia ONE project. During construction and decommissioning, fishing vessels would be prohibited from entering a “rolling” 500m safety zone around installations within the East Anglia ONE site. During the installation of offshore export cables there would be a temporary advisory exclusion area until works are complete. Loss of fishing area during construction and decommissioning is generally considered to be of minor significance.

33 During operation of the East Anglia ONE project, 50m safety zones could be implemented around wind turbines, collector stations, converter stations and the meteorological mast. Loss of fishing area during operation is considered to be of negligible to minor significance.
Good construction practice and compliance with standard offshore policies should ensure that impacts from obstacles on the seabed, which could cause loss or damage to nets and other fishing gear, would be of negligible significance. The offshore export cables would be monitored to ensure that they remain buried.

Liaison with relevant fishing interests, and timely circulation of information, would ensure fishermen are fully informed of all project activities.

4.10 Shipping and Navigation

The East Anglia ONE site is located within the southern North Sea, an area of UK waters that experiences relatively high shipping activity associated with passing traffic and vessels using the ports of Felixstowe, Harwich, Great Yarmouth, Lowestoft and Ipswich. Two deep water shipping routes (designated by the International Maritime Organisation) are present, running north to south along the eastern boundary of the site. The possibility of an increased risk of collisions for commercial and recreational vessels has been considered within the EIA.

As part of the assessment, a navigational risk assessment has been undertaken informed by consultation with key marine and navigational stakeholders to identify and assess navigational hazards associated with the construction, operation and decommissioning of the East Anglia ONE project.
As it is not possible to reduce all shipping and navigation safety risks to zero, the approach has been to reduce risks to a level that is as low as reasonably practicable. This would be achieved during construction through a number of mitigation measures, including safety zones, distribution of information to the shipping industry and the use of guard vessels around works that pose most risk to vessel safety. During operation, risks would be reduced through careful site layout coupled with the marking and lighting of infrastructure, and the distribution of site location information.

The assessment concluded that, with the implementation of mitigation measures, risks would be as low as reasonably practicable. Moderate impacts on routeing have been identified.

4.11 Aviation and Ministry of Defence

The presence of wind turbines can be detected on radar. During the initial selection process of the East Anglia ONE project, one of the key considerations was the avoidance of areas visible to civil aviation and national defence radar.

Based on internal modelling, and following external consultation, no significant impact on the air surveillance (radar) and navigation services provided by NATS En-route plc or on the Trimingham Air Defence radar, is predicted.

4.12 Telecommunications and Interference

The presence of wind turbines can block or interfere with the operation of marine radar and telecommunication systems.

The assessment looked at the potential impact of wind turbines on oil and gas platform radars, onshore marine radars and telecommunication systems such as automatic identification systems, VHF radio and radio and distress beacons (used by ships for navigation and communication), as well as fixed line of sight (microwave) links, global positioning system (GPS), mobile telephones and television.

The assessment concluded that impacts on marine radar, telecommunications or other communication and navigation systems would be not significant.

4.13 Archaeology and Cultural Heritage

The construction of infrastructure can cause direct disturbance to known archaeological sites. No known prehistoric sites or remains of archaeological or cultural value were found during the archaeological review of the geophysical
surveys undertaken. However, numerous wrecks were identified from the geophysical data and historical records. There is one record of a crashed aircraft, although surveys have failed to identify material at the location and it is possible that no remains exist. It is also possible that there are uncharted wreck sites in the study area.

46 Buffer zones, within which construction and associated activities would not take place, would be implemented to protect these features, in agreement with English Heritage and the Marine Management Organisation.

47 In addition to known features of archaeological and cultural interest, there is also potential for as yet undiscovered archaeological, maritime and aviation sites and finds to be present within the study area. The preparation and implementation of a Written Scheme of Investigation (WSI) would ensure that there would be no significant impacts to resources of archaeological or cultural value during construction or decommissioning. This document outlines the archaeological baseline and the mitigation that would be implemented in order to monitor and record features identified of archaeological interest during the construction, operation and decommissioning of the East Anglia ONE project,

*Diagram 4-1 Sidescan Sonar image of an unknown wreck located in the west of the East Anglia ONE site, as recorded during the 2010/2011 geophysical survey*
4.14 Infrastructure and Other Users

48 Impacts on infrastructure and other assets in and around the East Anglia ONE site, including other windfarms, non-aviation military and Ministry of Defence activities, oil and gas pipelines and platforms, cables, aggregate dredging, marine disposal grounds and unexploded ordnance, were considered.

49 The offshore cable corridor would cross existing telecommunication cables, high voltage electrical cables and one gas pipeline. One currently active telecommunications cable passes through the East Anglia ONE site. Discussions with operators and the implementation of crossing agreements would be undertaken.

50 Construction, maintenance and decommissioning activities may also disturb unmarked unexploded ordnance which could pose a health and safety risk. Mitigation would be put in place to limit this risk to a level considered to be as low as reasonably practicable and within acceptable limits. Other user impacts have been avoided through site selection.

51 The EIA concluded that the potential impacts on other infrastructure in the vicinity of the East Anglia ONE project would not be significant.

4.15 Airborne Noise

52 Due to the distance between the East Anglia ONE site and the coast (over 43km away) noise from the construction, operation and decommissioning of the offshore elements of the East Anglia ONE project would not be audible and therefore impacts of airborne noise would not be significant.

4.16 Cumulative Impacts

53 Cumulative impacts are impacts that arise from the interaction of the East Anglia ONE project with impacts from other plans or projects, including other planned windfarms.

54 Potential cumulative impacts have been identified within the ES, including potential displacement of fish and marine mammals, collision and displacement of birds, and restricted access for vessels as a result of the construction and operation of a number of offshore projects.

55 The results of cumulative noise modelling for fish indicates that construction noise from piling at the East Anglia ONE site and other planned southern North Sea windfarms would not overlap to cause a behavioural change to fish. Assuming
Piling does not happen at the same time, the total area of potential disturbance from the projects assessed would be small in the context of the wide distributional ranges of the fish species under consideration. Impacts would therefore not be significant.

Potential noise displacement areas for harbour porpoise from a number of windfarms were also modelled. Despite the high value/sensitivity of harbour porpoise, only a small percentage of the overall population would potentially be affected by displacement from construction noise, therefore the overall cumulative impact is not considered significant.

A cumulative impact assessment for birds was undertaken to consider the East Anglia ONE project alongside other planned windfarms in the southern North Sea. Whilst it is unlikely that there would be any significant impact on sensitive bird species from the East Anglia ONE project in isolation, there is a possibility for potentially significant cumulative impacts in relation to some key species.

On the basis of the relative size of the East Anglia ONE site in comparison to the combined potential areas of other windfarms, possible Marine Conservation Zones and aggregate dredging areas, the proportional contribution of East Anglia ONE to the cumulative loss of fishing area would be minor. This contribution is further reduced by the fact that fishing could resume within the East Anglia ONE site and other operational windfarms during operation.

In order to assess cumulative impacts on shipping and navigation, a navigation study was commissioned in which shipping movements were plotted and overlaid with planned offshore windfarm boundaries across the southern North Sea. Offshore windfarm boundaries were amended where possible to minimise potential changes to existing routes and remaining concerns were discussed with statutory organisations. Based on this work, and assuming suitable routeing measures can be agreed where required, cumulative impacts on shipping and navigation are considered not to be significant.

### 4.17 Biological Inter-relationships

In addition to considering the impacts in relation to individual environmental topics, the EIA has considered the potential inter-relationship of impacts and how together they may affect the overall marine ecosystem. The assessment concluded that in all cases these inter-relationships would not result in impacts any more significant than those predicted for individual environmental topics in isolation.
4.18 Transboundary Impacts

61 An assessment was carried out to identify any transboundary impacts. These are impacts that would be experienced by sensitive receptors in other nearby countries’ waters.

62 The assessment concluded that potential transboundary impacts are confined to impacts on commercial fisheries, navigation, ornithology and marine mammals, but that none of these potential impacts would be significant.
5 Onshore Environmental Impacts

5.1 Introduction

1 The EIA has identified all of the impacts on the onshore environment that are likely to arise as a result of the East Anglia ONE project. These include impacts on the physical, biological and human environment.

5.2 Ground Conditions and Contamination

2 The solid geology of the Onshore Cable Route and Converter Station Compound comprises chalk, overlain by London Clay with outcrops of Red Crag deposits towards the coastal areas. Bawdsey Cliffs is a Site of Special Scientific Interest, designated due to its geological characteristics (Red Crag).

3 The bedrock beneath the Onshore Cable Route and Converter Station Compound is classified as principal and secondary aquifer (water bearing permeable rock). The Onshore Cable Route crosses areas designated as water source protection zones for public supply by the Environment Agency. Former mineral extraction sites, historic landfill sites, potentially contaminated sites and water abstraction points are known to exist within the area.

4 Excavation for the cable trench and converter station foundations would affect soils and shallow geology; there is also potential for impacts from spillages of materials/chemicals used in construction.

5 The use of best practice construction techniques, including reinstatement of topsoil and subsoil layers and pollution control measures, through adherence to a Code of Construction Practice, would ensure that impacts are not significant.

6 The decision to use horizontal directional drilling to install the cables under Bawdsey Cliffs would avoid impacts on cliff stability and direct impacts to the SSSI.

5.3 Air Quality

7 The purpose of the East Anglia ONE project is to increase energy production from renewable sources with the aim of reducing emissions associated with global climate change.

8 Air quality in the area is generally good. During construction, potential impacts to air quality could arise from construction activities and exhaust emissions from site plant. Significant emissions during operation are not anticipated.
An Air Quality Management Plan would be prepared, including dust control and traffic management measures (eg vehicle washing on site departure as necessary), which would ensure that all impacts are not significant.

5.4 Water Resources and Flood Risk

The Onshore Cable Route crosses the River Deben, River Fynn, River Lark and River Gipping as well as numerous smaller watercourses and drainage channels, creek networks and marshlands. There are also a number of man-made flood defences and flood zones in the area.

The use of HDD for major river crossings and under estuarine and flood defences would mitigate any potential impacts of East Anglia ONE in relation to flooding. Method statements would be produced for the crossing and reinstatement of all watercourses.

During construction, operation and decommissioning, treatment of run-off would conform to best practice procedures to prevent pollution downstream.

The adoption of best practice construction techniques, including storage of material away from watercourses, would minimise the risk of impacts to groundwater and surface water quality and ensure that impacts are not significant.

5.5 Land Use

Land use along the Onshore Cable Route is primarily agricultural, with scattered rural settlements and some areas of woodland. The largest urban areas in the vicinity are Ipswich and Woodbridge. Land use at the Converter Station Compound and Temporary Works Area is also agricultural. Agricultural Land Classification (ALC) along the Onshore Cable Route and at the Converter Station Compound ranges from grade 2 (very good) to grade 4 (poor quality).

Over 40 public rights of way are crossed by the Onshore Cable Route and there is a public right of way adjacent to the Converter Station Compound.

The proposed works would cause temporary disruption, and loss of a growing season, in the areas affected. Temporary closures are proposed for most crossings of Public Rights of Way with the exception some HDD sites where temporary closures are not necessary. The Suffolk Coastal Path at the landfall location is currently impassable due to erosion. If reinstated by time of construction, EAOW would seek to maintain access along the path during construction. During operation, agricultural operations would be maintained along the Onshore Cable Route; however excavation activities that could expose the cable or the construction
of permanent buildings would be restricted. Permanent access to the Onshore Cable Route for maintenance would be required at jointing bays.

Plate 5-1 Illustrative Exit Point for Minor HDD Crossings. Example Exit Point (Courtesy A E Yates Ltd)

17 With mitigation measures in place, including the appointment of a qualified Agricultural Liaison Officer (ALO) to ensure that land is correctly reinstated, and the use of best practice construction techniques, the majority of impacts assessed would not be significant. Moderate impacts are predicted due to temporary loss of high grade land during construction and permanent loss at the converter station. No significant impacts are predicted on impacts to Public Rights of Way during construction, operation or decommissioning.

5.6 Ecology and Ornithology

18 Detailed site-specific surveys and desk based research have been used to establish existing habitats and species within the Onshore Cable Route and Converter Station Compound and Temporary Works Area. Careful routeing and the use of HDD at sensitive locations have enabled avoidance of many of the features identified.

19 Potential impacts during construction include habitat loss and disturbance, disturbance to protected species, the potential to spread invasive plant species and potential run-off into watercourses. Impacts identified are assessed as significant at a local or site level only. Proposed mitigation would include re-instatement of habitats following construction, restricted vehicular access at sensitive locations, and the use of best practice construction techniques. All mitigation would be incorporated into an Ecological Management Plan (EMP).
No significant impacts are anticipated during the operation of the onshore cables as these are buried underground.

During operation of the Converter Station, directional lighting would be used to minimise light spill on adjacent habitats and minimise impacts on birds and bats.

### 5.7 Archaeology and Cultural Heritage

Known designated heritage assets within the 500m wide onshore study area include one Registered Park and Garden (Grade II Bawdsey Manor landscape and gardens), one Scheduled Monument (19th century Martello Tower, also a Grade II listed building), seven Grade II* and 34 Grade II listed buildings plus a further 589 non-designated heritage assets. In addition to known heritage assets, there is also the potential for undiscovered subsurface archaeology.

The assessment considered both direct impacts on cultural heritage and impacts on setting. The majority of impacts on heritage assets have been avoided through careful route selection. A Written Scheme of Investigation would be implemented to ensure heritage features found during construction are monitored and recorded.

The Converter Station Compound would have a minor impact on the setting of a nearby Grade II listed building. Following mitigation, impacts on buried archaeology would be not significant. Where previously unidentified archaeological assets are uncovered during construction, impacts would be mitigated through preservation by record resulting in a neutral impact.

### 5.8 Noise and Vibration

The Onshore Cable Route runs largely through rural areas. The Converter Station Compound is also situated in a quiet, rural area.

A noise survey was undertaken at the site of the Converter Station Compound to identify background noise levels. Predicted construction and operation noise levels were then calculated.

Although predicted noise levels are below set limits for many construction activities, noise limits could be exceeded for short periods at the HDD sites. The predicted operational noise levels from the Converter Station Compound would be within acceptable limits.
Noise levels at HDD locations would be reduced through the layout of the site, utilising site buildings to screen the noisiest elements of the works from nearby residences and additional screening. To prevent excessive vibration in buildings close to the road network during construction, prior to the beginning of construction, holes and cracks in roads nearby buildings would be checked and sealed or temporarily covered.

Plate 5-2 Typical Drilling Rig Used for Minor HDD Crossings (Courtesy A E Yates Ltd)

With mitigation in place, impacts of noise and vibration from the construction, operation and decommissioning activities would not be significant.

5.9 Traffic and Transport

The main roads surrounding the offshore electrical transmission works are the A12 and A14. Other roads include the B1113, the B1078, the B1077, the B1079, the B1083 and Kirton Road. A review of available traffic data showed that many of the routes in the area are heavily utilised.

The construction works could affect road safety and temporarily cause pedestrian and driver delay, increase dust and dirt on the road network and, in some cases, reduce access.

The use of Construction Consolidation Sites (CCS) as access points for the Onshore Cable Route would improve operational efficiency and ensure that only major roads experience the highest level of construction traffic. An Access Management Scheme would identify safe access to CCSs and temporary routes.

A Traffic Management Plan, agreed with Highway Authorities, would detail how individual road crossings would be managed, including safe access for pedestrians and cyclists, during the construction period. A Travel Plan would be developed to
minimise the number of vehicle trips being made by construction workers, eg through the use of designated pick up points.

34 Control measures, including wheel washing facilities, would minimise the risk of dust and dirt being spread onto the highway.

35 With mitigation in place, impacts are considered not significant.

Plate 5-3 Illustrative Jointing Bay Layout and Cable Pulling in Pre-Installed Ducts by “Rollers” with Sandbags as Ballast (Courtesy of Prysmian)
6 Scheme-Wide Issues

6.1 Introduction

1 Whilst the majority of topics covered by the EIA are related to either the marine or the terrestrial environment, there are some issues that cover both.

2 These scheme-wide issues are Socio Economics and Seascape, Landscape and Visual Amenity and are described below.

6.2 Socio Economics

3 ScottishPower Renewables (UK Limited) & Vattenfall Wind Power Ltd, which jointly own the East Anglia Offshore Wind Limited (EAOW) Joint Venture, support the offshore wind industry’s vision that UK firms should provide more than 50% of the content of future windfarms. To that end EAOW will work toward this target on East Anglia ONE and its future projects such that through proactive engagement with UK Suppliers, and East Anglia suppliers in particular, a sustainable and high quality UK offshore wind industry can be developed.

4 The final selection of the port facilities required to construct and operate the East Anglia ONE project has not yet been determined. EAOW are in detailed discussions with local ports on servicing the operational and construction requirements. Through the ongoing development of regional skills programmes supported by central government, a large proportion of the workforce is likely to come from East Anglia although temporary specialist construction and decommissioning jobs could come from a wider area.

5 Within the local population, there is an extensive capacity to up-skill the workforce and deliver transferrable skills that prepare people for employment opportunities offshore and in other related industries.

6 The scale of East Anglia ONE, the first 1,200MW project in the 7,200MW East Anglia zone, is such that it is likely to provide the confidence in skills and training providers to invest further in such capacity to ensure the region benefits as much as possible from the range of employment opportunities the project has the potential to create.

7 In the East Anglia region the East Anglia ONE project could provide up to 1,669 full-time equivalent (FTE) construction jobs and up to £104.8m per annum of economic benefit across the two and a half year construction period.
During the operation and maintenance phase, there could be up to 168 FTE jobs and an additional economic benefit of up to £10.6m per annum over the 25 year life of the project. This would have a minor positive impact upon the local labour market and lead to additional expenditure in the area.

The number of jobs that would be created during the decommissioning phase is estimated to be approximately 200 FTE jobs and the additional economic benefit is estimated at £12.6m per annum for the two years required.

The assessment has confirmed that there would be beneficial impacts to the local and regional economy and labour market even accounting for the possibility that not all direct project expenditure would arise in the UK. Sustained significant impacts on tourism and recreation in the area are not predicted.

6.3 Seascape, Landscape, and Visual Amenity

EAOW are committed to undergrounding the onshore cables from the landfall location to the converter station compound.

The installation of the onshore export cables would result in major, albeit temporary, significant landscape and visual impact during construction. Mitigation measures, including restoration of arable farmland, and hedge and tree planting along the route, would reduce the majority of impacts such that they would not be significant. There is potential for major significant impacts in relation to a limited number of tree-lined hedgerows along the route; EAOW would work with local authorities to minimise these impacts where possible.

The Converter Station Compound, which is adjacent to the existing Bramford substation, is also predicted to result in major significant impacts during both construction and operation due to the presence of the building, associated lighting, and construction equipment.

Mitigation measures are proposed, including the use of appropriately coloured cladding material, earth mounding and vegetation planting screens, and hedgerow management to increase hedge heights above eye level.

While the majority of the Converter Station Compound would be successfully screened by this mitigation and therefore visual impacts minimised, the top of the converter hall buildings would still be visible from some locations.

With regards to seascape no significant residual effects are predicted. However, significant residual effects are predicted in relation to recreational sailing and specific ferry routes.
6.4 Cumulative Impacts

Potential cumulative impacts on landscape and visual amenity have been identified within the ES in relation to the presence of the converter stations required for the East Anglia ONE project and from two further projects from the East Anglia zone. Whilst the majority of the development could be successfully screened to minimise visual impacts, the top of the converter hall buildings would still be visible from certain locations. Mitigation planting would ensure that landscape effects would not be significant.
7 Summary

1 The East Anglia ONE Offshore Windfarm is a Nationally Significant Infrastructure Project and would make a significant contribution to the UK renewable energy generation targets, securing reliable electricity supplies as the UK makes the transition to a low carbon economy.

2 Early consultation with statutory and non statutory organisations and the local community has been extremely valuable in informing the process of site selection and project design.

3 An EIA for the offshore, onshore and scheme-wide elements of the project has been completed in accordance with EU and UK Regulations. The findings of the EIA have been presented in an Environmental Statement and submitted as part of the Development Consent Order application for the East Anglia ONE project.

4 The EIA has assessed the potential impacts, both positive and negative, of all aspects of the project. Significant impacts would be minimised through the inclusion of appropriate mitigation measures.
8 Further Information

1 For further information on the East Anglia ONE Offshore Windfarm please refer to the project website, www.eastangliawind.com.

2 Questions and comments on the project can be sent to the East Anglia Offshore Wind team using our email address, eastangliaone@eastangliawind.com. Alternatively you may wish to write to us as the freepost address below.

FREEPOST RSTC-EJEY-RKRX
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Figure 2

Legend

- East Anglia zone
- East Anglia ONE windfarm site
- Offshore cable corridor
- Onshore cable route
- RAMSAR
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Recommended Marine Conservation Zone (rMCZ)
- Piddock reef
- Sabellaria density

Notes:
1. Data supplied by Natural England (02/05/12)
2. Data supplied by Joint Nature Conservation Committee (JNCC) (03/05/12)
3. Data derived from Thames REC surveys (2007 - 2008)
4. Data derived from East Coast REC surveys (2009 - 2011)
Figure 3

Legend
- Development area
- Area of Outstanding Natural Beauty (AONB)
- Ancient Woodland
- Country park
- Environmentally Sensitive Area (ESA)
- Grassland Network
- Local Nature Reserve (LNR)
- Lowland Heathland
- RAMSAR
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)
- Recommended Marine Conservation Zone Reference Area (rRA)
- Recommended Marine Conservation Zone (fMCZ)
- Contaminated land
- County wildlife site
- Scheduled monument
- Parks and Gardens
- Woodland

Notes:
1. Data supplied by Natural England (02/05/12)
2. Data supplied by Joint Nature Conservation Committee (JNCC) (03/05/12)
3. Derived from Ordnance Survey 1:10,000 mapping (11/05/11)
4. Data supplied by Natural England (02/09/11)
5. Data supplied by English Heritage (10/01/12)
6. Ordnance Survey VectorMap (05/10/11)


6715-126-PA-039-A
Secondary CCS (East Anglia ONE)

Temporary works area

Temporary access works

Legend

Development area
Detail of route works
Onshore cable route
HDD section
Detail of temporary works
Primary construction consolidation site (CCS)
Secondary construction consolidation site (CCS)
Temporary works area
Access routes
Strategic access route
Suffolk Lorry Route Network
Alternative distributor access route
Local access route
Alternative local access route

Notes:
1. Temporary works area at the Bramford converter station includes 6 cables to connect to the converter station compound.

Figure 4
Notes:
1. A small additional area is required to the south of the current converter station development area within National Grid’s landholding to enable connection of East Anglia ONE to National Grid infrastructure. This extra area is included with the DCO documents but not the Environmental Statement figures.
2. Includes 4 cables to connect to the converter station compound (East Anglia ONE).
East Anglia ONE Offshore Windfarm
Order 2012
Illustrative Onshore Converter Station Elevation/Floor Plan
Drawings

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Isometric Wireframe (NTS)

South Elevation

North Elevation

East Elevation

West Elevation

Air handling units with acoustic barriers shown dashed

Air Insulated Switchgear (AIS) area

Control room

Spare parts storage

Transformers

Valve coolers

Converter hall building

Original A3 plot Scale

Figure 7

N/A 26/10/2012 A 6115.531-PA.043